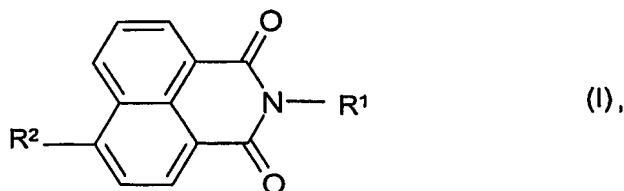


Claims

1. The use of naphthalene-1,8-dicarboxylic monoimides of the formula I



in which

R^1 is hydrogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl or heteroaryl and

R^2 is a radical containing at least one π electron system containing a carbon atom and at least one further atom selected from carbon, oxygen, and nitrogen, with the proviso that the radical contains at least one atom other than carbon

to protect organic material from the damaging effects of light.

2. The use as claimed in claim 1, wherein

R^1 is C_1 - C_{30} alkyl whose carbon chain may be interrupted by one or more nonadjacent groups selected from -O-, -S-, -NR³-, -CO- and/or -SO₂-, and/or which is unsubstituted or substituted one or more times by identical or different radicals selected from cyano, amino, hydroxyl, carboxyl, aryl, heterocycloalkyl, and heteroaryl, with aryl, heterocycloalkyl, and heteroaryl groups being unsubstituted or carrying one or more substituents selected independently of one another from C_1 - C_{18} alkyl and C_1 - C_6 alkoxy; or R^1 is C_5 - C_8 cycloalkyl which is unsubstituted or carries one or more C_1 - C_6 alkyl groups; or R^1 is 5- to 8-membered heterocycloalkyl which is unsubstituted or carries one or more C_1 - C_6 alkyl groups; or R^1 is aryl or heteroaryl, with aryl or heteroaryl being unsubstituted or carrying one or more radicals selected independently of one another from C_1 - C_{18} alkyl, C_1 - C_6 alkoxy, cyano, CONR⁴R^{4a}, CO₂R⁴, arylazo, and heteroarylazo, with arylazo and heteroarylazo in turn being unsubstituted or carrying one or more radicals selected independently of one another from C_1 - C_{18} alkyl, C_1 - C_6 alkoxy, and cyano;

R^3 is hydrogen or C_1 - C_6 alkyl; and

R^4 and R^{4a} each independently are hydrogen, C_1 - C_{18} alkyl, aryl or heteroaryl, with aryl and heteroaryl in each case being unsubstituted or carrying one or more substituents selected from C_1 - C_6 alkyl, C_1 - C_6 alkoxy, hydroxyl,

carboxyl and cyano.

3. The use as claimed in claim 2, wherein R^1 is C_1 - C_{12} alkyl, C_5 - C_8 cycloalkyl or phenyl, the two last-mentioned radicals each being unsubstituted or carrying one,
5 two, three, four or five C_1 - C_4 alkyl groups.
4. The use as claimed in claim 3, wherein R^1 is phenyl which is unsubstituted or carries one, two or three C_1 - C_4 alkyl groups.
- 10 5. The use as claimed in one of the previous claims, wherein
 R^2 is cyano, $-C(O)NR^5R^{5a}$ or phenoxy which carries one or more substituents
selected from C_1 - C_{12} alkyl, C_1 - C_{12} alkoxy, $-COOR^6$, $-SO_3R^6$, halogen,
hydroxyl, carboxyl, cyano, $-CONR^5R^{5a}$, and $-NHCOR^5$;
15 R^5 and R^{5a} each independently of one another are hydrogen, C_1 - C_{18} alkyl,
aryl or heteroaryl, aryl and heteroaryl each being unsubstituted or
carrying one or more substituents selected from C_1 - C_6 alkyl, C_1 - C_6
alkoxy, hydroxyl, carboxyl, and cyano; and
 R^6 is hydrogen or C_1 - C_6 alkyl.
- 20 6. The use as claimed in claim 5, wherein R^2 is cyano.
7. The use as claimed in claim 5, wherein R^2 is $-C(O)NH_2$.
- 25 8. The use as claimed in claim 5, wherein R^2 is phenoxy which carries one C_1 - C_{10}
alkyl group.
9. The use as claimed in one of the preceding claims, wherein the organic material
for protection is selected from plastics, polymer dispersions, paints, photographic
emulsions, photographic layers, paper, human or animal skin, human or animal
30 hair, cosmetic products, pharmaceutical products, cleaning products, and
foodstuffs.
10. The use as claimed in claim 9 to protect plastics.
- 35 11. The use as claimed in claim 10, wherein the plastic comprises at least one
polymer selected from polyesters, polycarbonates, polyolefins, polyvinyl acetals,
polystyrene, copolymers of styrene or of α -methylstyrene with dienes and/or
acrylic derivatives, polyurethanes, polyacrylates, polymethacrylates, and physical
40 blends of the aforementioned polymers.
12. The use of at least one naphthalene-1,8-dicarboxylic monoimide as defined in
one of claims 1 to 8 for preparing a layer which absorbs ultraviolet light.

13. The use as claimed in claim 12, wherein the layer is composed of a thermoplastic molding compound.
- 5 14. The use as claimed in claim 13, wherein the thermoplastic molding compound comprises at least one polymer selected from polyesters, polycarbonates, polyolefins, polyvinyl acetals, polystyrene, copolymers of styrene or of α -methylstyrene with dienes and/or acrylic derivatives, and physical blends of the aforementioned polymers.
- 10 15. The use as claimed in one of the previous claims, wherein the organic material contains at least one naphthalene-1,8-dicarboxylic monoimide I in an amount of from 0.01 to 10% by weight, based on the total weight of the material.
- 15 16. The use as claimed in one of the preceding claims together with at least one further light stabilizer which has at least one absorption maximum in the wavelength range from 280 to 320 nm.
- 20 17. The use of at least one naphthalene-1,8-dicarboxylic monoimide I as defined in one of claims 1 to 8 as sole light stabilizer from the naphthalene derivatives group to protect organic material from the damaging effects of light.
- 25 18. The use of at least one naphthalene-1,8-dicarboxylic monoimide I as defined in one of claims 1 to 8 as sole light stabilizer(s) to protect organic material from the damaging effects of light.
- 30 19. A composition comprising at least one naphthalene-1,8-dicarboxylic monoimide of the formula I as defined in one of claims 1 to 8, in an amount which provides protection from the damaging effects of light, and at least one organic material.
- 35 20. A composition as claimed in claim 19, wherein the organic material comprises a polymer selected from polyesters, polycarbonate polymers, polyolefins, polyvinyl acetals, polystyrene, copolymers of styrene or of α -methylstyrene with dienes and/or acrylic derivatives, and physical blends of the aforementioned polymers.
- 40 21. A composition as claimed in claim 20, wherein the polyvinyl acetal is a polyvinyl butyral.
22. A composition as claimed in claim 20, wherein the polycarbonate polymer is selected from polycarbonates, polycarbonate copolymers, and physical blends of polycarbonates with acrylonitrile-butadiene-styrene copolymers, acrylonitrile-styrene-acrylate copolymers, polymethyl methacrylates, polybutyl acrylates, polybutyl methacrylates, poly(butylene terephthalate)s, and polyethylene terephthalates.

23. A composition as claimed in claim 20, wherein the polyester is a polyethylene terephthalate.
24. A composition as claimed in claim 20, wherein the polyolefin is a high-density polyethylene or a polypropylene.
25. A composition as claimed in claim 20, wherein the copolymer of styrene with dienes and/or acrylic derivatives is an acrylonitrile-butadiene-styrene copolymer or a styrene-acrylonitrile copolymer.
26. A composition as claimed in claim 21, comprising
- at least one naphthalene-1,8-dicarboxylic monoimide of the formula I as defined in one of claims 1 to 8;
 - at least one polyvinyl butyral;
 - at least one oligoalkylene glycol alkylcarboxylic diester plasticizer;
 - at least one aliphatic carboxylic salt for controlling the adhesion;
 - if desired, at least one further UV absorber selected from benzotriazoles, 2-phenyl-1,3,5-triazines, hydroxybenzophenones, diphenylcyanoacrylates, and mixtures thereof; and
 - if desired, at least one further component selected from fillers, dyes, pigments, and additional additives.
27. A composition as claimed in claim 26, wherein the further UV absorber is selected from 2-(3'-tert-butyl-2'-hydroxy-5'-methylphenyl)-5-chlorobenzotriazole, 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol, 2-(2H-benzotriazol-2-yl)-4,6-di-tert-pentylphenol, 2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-hexyloxyphenol, 2-benzotriazol-2-yl-4-methylphenol, 2-hydroxy-4-n-octoxybenzophenone, 2,4-bis(2,4-dimethylphenyl)-6-(2-hydroxy-4-octyloxyphenyl)-1,3,5-triazine, 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis{[2'-cyano-3',3'-diphenylacryloyl)oxy]-methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, 2-ethylhexyl 2-cyano-3,3-diphenylcyanoacrylate, and mixtures thereof.
28. A composition as claimed in claim 22, comprising
- at least one naphthalene-1,8-dicarboxylic monoimide of the formula I as defined in one of claims 1 to 8;
 - at least one polycarbonate polymer selected from polycarbonates, polycarbonate copolymers, and physical blends of polycarbonates with acrylonitrile-butadiene-styrene copolymers, acrylonitrile-styrene-acrylate copolymers, polymethyl methacrylates, polybutyl acrylates, polybutyl methacrylates, poly(butylene terephthalate)s, and polyethylene terephthalates;
 - at least one stabilizer selected from phosphites, phosphonites, and mixtures thereof;
 - if desired, at least one further UV absorber selected from benzotriazoles, 2-phenyl-1,3,5-triazines, diphenylcyanoacrylates, and mixtures thereof;

- if desired, at least one 2,6-dialkylated phenol antioxidant; and
- if desired, at least one further component selected from fillers, dyes, pigments, and other additives.

- 5 29. A composition as claimed in claim 28, wherein the further UV absorber is selected from 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis-[[2'-cyano-3',3'-diphenylacryloyl)oxy]methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, 2-(2H-benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol, 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol, 2-(2H-benzotriazol-2-yl)-4-(1,1,3,3-
- 10 tetramethylbutyl)phenol, 2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol, 2,2'-methylenebis(6-(2H-benzotriazol-2-yl)-4-1,1,3,3-tetramethylbutyl)phenol, 2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-hexyloxyphenol, the transesterification products of methyl 3-(3-(2H-benzotriazol-2-yl)-5-tert-butyl-4-hydroxyphenyl)propionate with polyethylene glycol, and mixtures of these UV
- 15 absorbers.
30. A composition as claimed in claim 23, comprising
- at least one naphthalene-1,8-dicarboxylic monoimide as defined in one of claims 1 to 8;
 - 20 - at least one polyethylene terephthalate;
 - at least one 2,6-dialkylated phenol antioxidant;
 - at least one costabilizer selected from phosphites, phosphonites, and mixtures thereof; and
 - 25 - if desired, at least one further UV absorber selected from diphenylcyanoacrylates, phenyl-1,3,5-triazines, and benzotriazoles, and mixtures thereof.
31. A composition as claimed in claim 30, wherein the further UV absorber is selected from 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis-[[2'-cyano-3',3'-diphenylacryloyl)oxy]methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, 2-ethylhexyl 2-cyano-3,3-diphenylacrylate, 2-(2H-benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol, 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol, 2,2'-methylenebis(6-(2H-benzotriazol-2-yl)-4-1,1,3,3-tetramethylbutyl)phenol, 2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-hexyloxyphenol, the transesterification products of methyl 3-(3-(2H-benzotriazol-2-yl)-5-tert-butyl-4-hydroxyphenyl)propionate with polyethylene glycol, and mixtures of these UV absorbers.
- 35
32. A composition as claimed in one of claims 30 and 31, wherein the polyethylene terephthalate is an amorphous polyethylene terephthalate and the composition additionally includes at least one acetaldehyde scavenger.
- 40
33. A composition as claimed in one of claims 30 to 32, wherein the composition additionally includes at least one further component selected from reheating agents, dyes, pigments, and further additives.
- 45

34. A composition as claimed in one of claims 30 and 31, wherein the polyethylene terephthalate is a partially crystalline polyethylene terephthalate and the composition additionally includes at least one nucleating agent.
- 5 35. A composition as claimed in claim 24, comprising
- at least one naphthalene-1,8-dicarboxylic monoimide as defined in one of claims 1 to 8;
 - at least one high-density polyethylene or one polypropylene;
 - at least one 2,6-dialkylated phenol antioxidant;
 - 10 - at least one costabilizer selected from phosphites, phosphonites, and mixtures thereof;
 - if desired, at least one further UV absorber selected from diphenylcyanoacrylates, hydroxybenzophenones, phenyl-1,3,5-triazines, and benzotriazoles, and mixtures thereof;
 - 15 - if desired, at least one sterically hindered amine; and
 - if desired, a further component selected from dyes, pigments, and further additives.
- 20 36. A composition as claimed in claim 35, wherein the further UV absorber is selected from 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis[{2'-cyano-3',3'-diphenylacryloyl)oxy)methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, 2-hydroxy-4-n-octoxybenzophenone, 2-(4,6-diphenyl-1,3,5-triazin-2-yl)-5-hexyloxyphenol, 2,4-bis(2,4-dimethylphenyl)-6-(2-hydroxy-4-octyloxyphenyl)-1,3,5-triazine, 2-(2H-benzotriazol-2-yl)-4,6-bis-(1-methyl-1-phenylethyl)phenol, 25 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol, 2-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol, 2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol, 2,2'-methylenebis(6-(2H-benzotriazol-2-yl)-4-1,1,3,3-tetramethylbutyl)phenol), the esterification products of methyl 3-(3-(2H-benzotriazol-2-yl)-5-tert-butyl-4-hydroxyphenyl)propionate with polyethylene glycol, and mixtures of these UV absorbers.
- 30 37. A composition as claimed in claim 20, comprising
- at least one naphthalene-1,8-dicarboxylic monoimide of the formula I as defined in one of claims 1 to 8;
 - 35 - at least one polystyrene;
 - at least one 2,6-dialkylated phenol antioxidant;
 - at least one costabilizer selected from phosphites, phosphonites, and mixtures thereof;
 - if desired, at least one further UV absorber selected from benzotriazoles, diphenylcyanoacrylates, and mixtures thereof;
 - 40 - if desired, at least one sterically hindered amine; and
 - if desired, at least one further component selected from dyes, pigments, and further additives.

38. A composition as claimed in claim 37, wherein the further UV absorber is selected from 2-(2H-benzotriazol-2-yl)-4,6-di-tert-pentylphenol, 2-benzotriazol-2-yl-4-methylphenol, 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, and mixtures thereof.

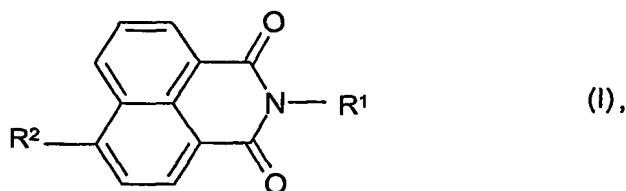
39. A composition as claimed in claim 25, comprising

- at least one naphthalene-1,8-dicarboxylic monoimide as defined in one of claims 1 to 8;
- at least one acrylonitrile-butadiene-styrene copolymer or styrene-acrylonitrile copolymer;
- at least one 2,6-dialkylated phenol antioxidant;
- at least one costabilizer selected from phosphites, phosphonites, and mixtures thereof;
- if desired, at least one further UV absorber selected from benzotriazoles, hydroxybenzophenones, diphenylcyanoacrylates, and mixtures thereof;
- if desired, at least one sterically hindered amine; and
- if desired, a further component selected from dyes, pigments, and further additives.

40. A composition as claimed in claim 39, wherein the further UV absorber is selected from 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)-phenol, 2-hydroxy-4-n-octoxybenzophenone, 2-benzotriazol-2-yl-4-methylphenol, 1,3-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]-2,2-bis[(2'-cyano-3',3'-diphenylacryloyl)oxy]methyl}propane, ethyl 2-cyano-3,3-diphenylacrylate, and mixtures thereof.

41. A process for protecting organic material from the damaging effects of light, which comprises adding to said material at least one naphthalene-1,8-dicarboxylic monoimide of the formula I as defined in one of claims 1 to 8.

42. Compounds of the formula I



in which

R^1 is hydrogen, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl or heteroaryl; and

R^2 is cyano, $-C(O)NR^5R^{5a}$ or phenyloxy which carries one, two, three, four or five C_1 - C_{12} alkyl groups; and

R^5 and R^{5a} each independently of one another are hydrogen, C_1 - C_{18} alkyl, aryl or heteroaryl, aryl and heteroaryl each being unsubstituted or

carrying one or more substituents selected from C₁-C₈ alkyl, C₁-C₈ alkoxy, hydroxyl, carboxyl, and cyano.

43. Compounds of the formula I as claimed in claim 42, wherein
5 R¹ is C₅-C₈ cycloalkyl or phenyl, C₅-C₈ cycloalkyl or phenyl each being
unsubstituted or carrying one, two, three, four or five C₁-C₄ alkyl groups.